REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested.

The application relates to a method for producing a hard mask for a capacitor device. The hard mask is formed in fewer steps than conventional methods using a photosensitive sol-gel layer. Firstly, the sol-gel layer is applied to the capacitor device. Secondly, the sol-gel layer is patterned. Lastly, a nitrogen thermal decomposition treatment is applied to the patterned layer to convert it to a hard mask layer comprising a metal nitride. The hard mask layer may then be etched according to the applied pattern.

Claims 1-7 and 12-14 are directed to the above method. Claim 15 is directed to a ferroelectric capacitor device etched according to this method. Claim 16 is directed to a FeRAM device etched according to this method and Claim 17 is directed to a hard mask formed according to the method.

The rejection alleges that the claims of the present application are obvious based on Aggarwal in view of Maloney. This contention is respectfully traversed.

Independent Claim 1 of the present application recites "applying a nitrogen thermal decomposition treatment to said patterned layer to convert it to a hard mask layer comprising a metal nitride". This is not obvious based on the combined

teaching of Aggarwal and Maloney. Neither the Maloney document nor the Aggarwal document, nor the combination, discloses or suggest a nitrogen thermal treatment being used as the conversion process to produce a metal nitride hard mask. As the remaining claims are appended to Claim 1, it is also submitted that the dependent claims are allowable over the combined teaching of Aggarwal and Maloney.

In particular, we submit that Aggarwal does not disclose or teach the following features of current Claim 1:

1. applying a photosensitive sol-gel layer to the capacitor device;

2. applying a pattern to said sol-gel layer to form a patterned layer;

3. applying a nitrogen thermal decomposition treatment to said patterned layer to convert it to a hard mask layer comprising a metal nitride.

By contrast, Aggarwal teaches:

1. applying a metal oxide or nitride such as silicon dioxide or titanium nitride to the capacitor device as a hard mask layer by sputter deposition using, for example, Ar + N_2 gas mixtures (see paragraphs [0069] and [0070]); and

2. applying a photoresist layer to the hard mask layer then applying a pattern using lithographic techniques (see paragraph [0071]).

Indeed, in Aggarwal, as is clearly explained in paragraphs [0069] and [0070], the hard mask layer is applied directly to the capacitor device by sputtering techniques. While the applied hard mask layer may be a metal nitride, [see paragraph [0067]], Aggarwal does not teach or disclose the formation of a hard mask layer using any form of thermal decomposition treatment, let alone a nitrogen thermal decomposition treatment. Paragraphs [0069] and [0070] of Aggarwal state that the metal nitride hard mask layer is applied directly to the capacitor device using sputtering techniques.

We further submit that Maloney does not disclose or teach applying a nitrogen thermal decomposition treatment to a patterned layer to convert it to a hard mask layer comprising a metal nitride, this being a feature of Claim 1 of the present application.

Thus, even if the skilled person were to combine the teachings of Aggarwal and Maloney, it is submitted that the hypothetical combination would not render obvious Claim 1, since features thereof are not disclosed or taught in Aggarwal or Maloney. In particular, there is no teaching in Aggarwal or Maloney of applying a nitrogen thermal decomposition treatment to a patterned layer to convert it to a hard mask layer comprising a metal nitride.

Furthermore, it is submitted that the skilled person would not be motivated to combine the teachings of Aggarwal and Maloney as Aggarwal and Maloney are directed to solving different problems. In particular, Aggarwal is directed to solving the problem of preventing reduction of iridium oxide during PZT formation (see paragraphs [0021-0028]) whereas Maloney is directed to solving the problem of reducing the complexity and costs in making barrier layers on substrates. Indeed, in terms of applying the hard mask layer, Aggarwal teaches away from the teaching in Maloney in that, in Aggarwal, when the hard mask layer is deposited by sputtering, it is already a metal oxide or nitride (see paragraph [0067]) whereas in Maloney an oxygen treatment is applied to form a metal oxide hard mask layer.

Thus it is submitted that Claim 1 is not anticipated by Maloney or Aggarwal when considered alone or in combination.

Dependent Claims 2-17 are dependent from Claim 1, and therefore are not anticipated by Aggarwal or Maloney when considered alone or in combination, for the reasons set out above in connection with Claim 1.

In summary, it is submitted that the present invention, as defined by the claims, is novel and inventive and is not anticipated by Maloney or Aggarwal when these documents are considered alone or in combination.

Applicant asks that all claims be allowed. Please apply the one month extension of time fee in the amount of $120, and any other applicable charges or credits, to Deposit Account No. 06-1050.

Respectfully submitted,

Date: June 8, 2006

Scott C. Harris
Reg. No. 32,030

Fish & Richardson P.C.
PTO Customer No. 20985
12390 El Camino Real
San Dieço, California 92130
(858) 678-5070 telephone
(858) 678-5099 facsimile

10598565.doc